United States Patent [19]

Hilgarth

[11] **Patent Number: 4,718,180**

[45] **Date of Patent: Jan. 12, 1988**

[54] **SKI BOOT**

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[21] Appl. No.: **907,983**

[22] Filed: **Sep. 16, 1986**

[30] **Foreign Application Priority Data**

Sep. 17, 1985 [AT] Austria 2709/85
Jan. 23, 1986 [AT] Austria 157/86

[51] **Int. Cl.**[4] **A43B 5/04**; A43C 11/00
[52] **U.S. Cl.** ..... **36/117**; 36/50; 36/54; 24/68 SK
[58] **Field of Search** ..... 36/50, 54, 117–121; 24/68 SK, 69 SK, 70 SK, 71 SK

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Primary Examiner—James Kee Chi
Attorney, Agent, or Firm—Fleit, Jacobson, Cohn & Price

[57] **ABSTRACT**

A ski boot having a shell and a leg portion (**3**) which is pivotable in the longitudinal direction relative to said shell. To permit entry into the boot from the rear, the leg portion may comprise a sleeve, which is to surround the front, lower portion of the user's shin bone and is open towards the heel, and a cover which is forwardly-upwardly and rearwardly-downwardly pivotable relative to said sleeve and, when the boot has been put on, the cover is securable on the sleeve by its closing means. The leg portion, or respectively the sleeve, has in its front region at least one slot which extends downwardly from its upper edge. In the instep region of the leg portion (**3**), this ski boot has two leg portion flaps (**18,18'**) which are interconnected by means of at least one pivot member (**21, 21***a*), so that they are vertically displaced in opposite directions relative to each other. An adjustable pressure or locking member is provided between the leg portion flaps (**18, 18'**) and, in one position, establishes a form- or force-locking connection with the two leg portion flaps (**18, 18'**) and, in another position, releases this connection.

8 Claims, 20 Drawing Figures

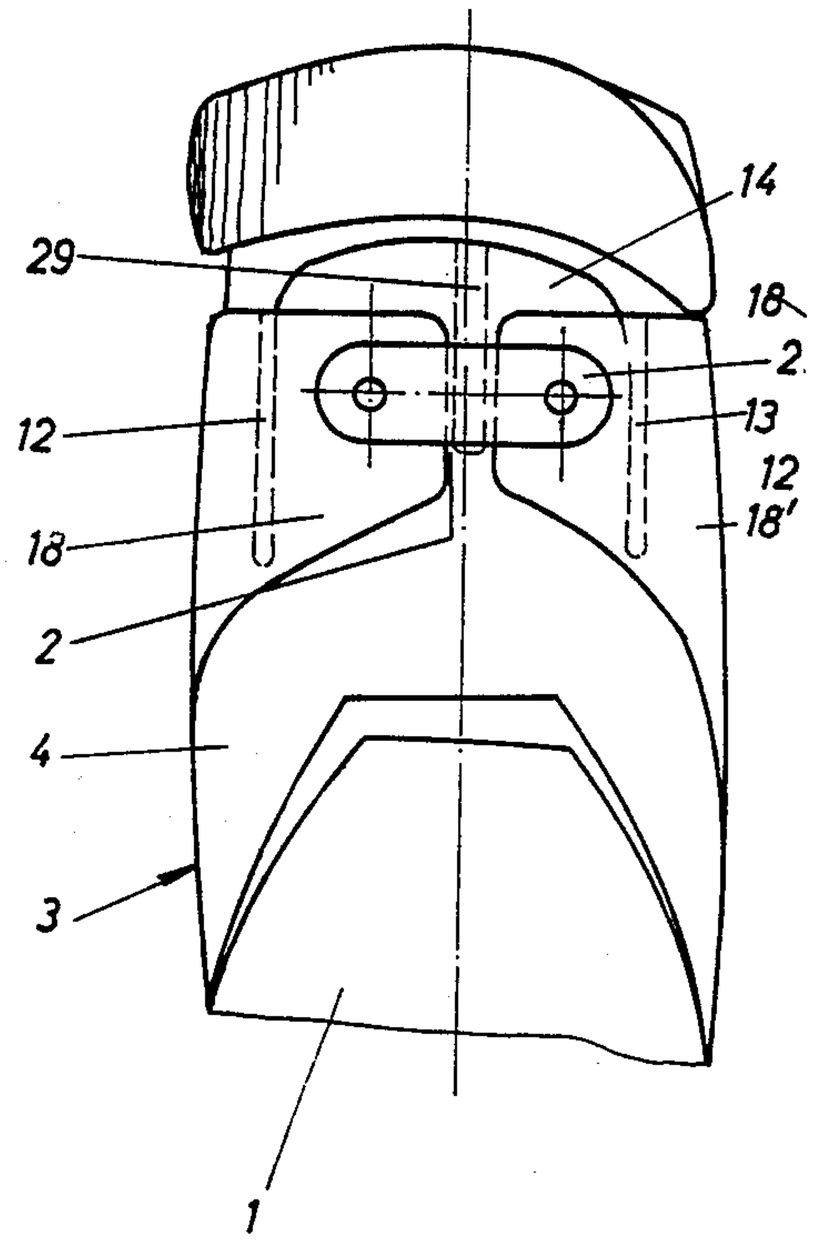
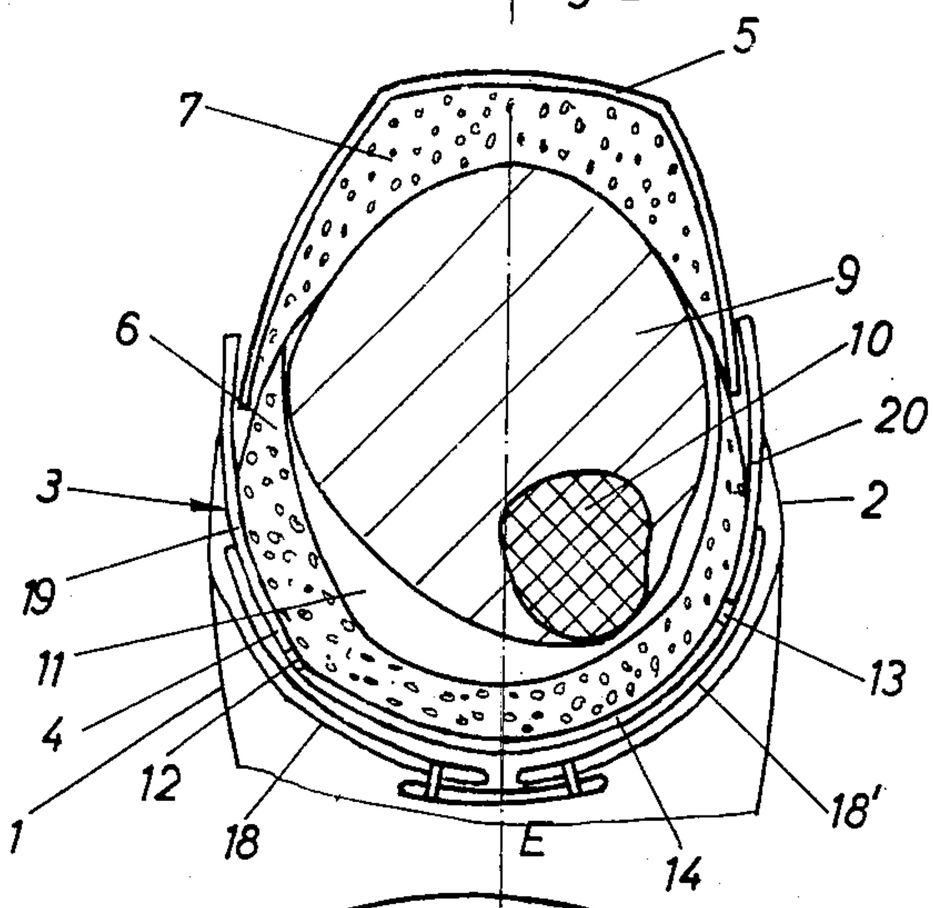


Fig. 2



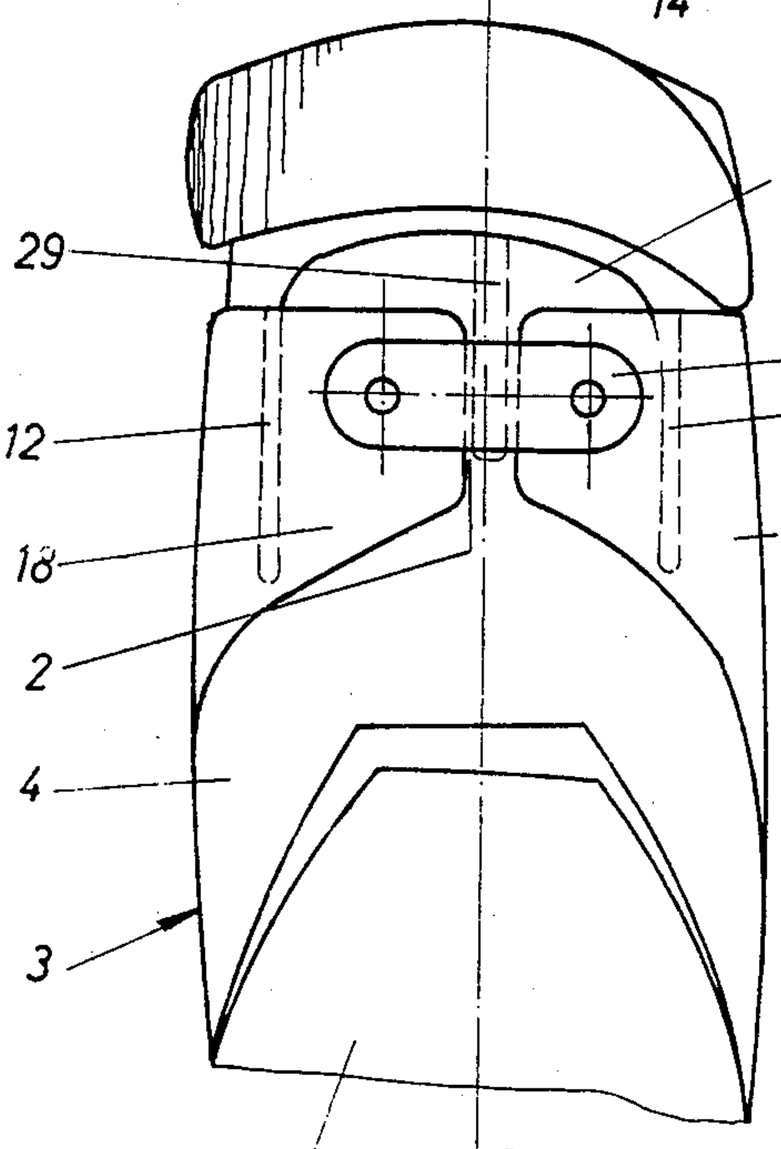


Fig.1

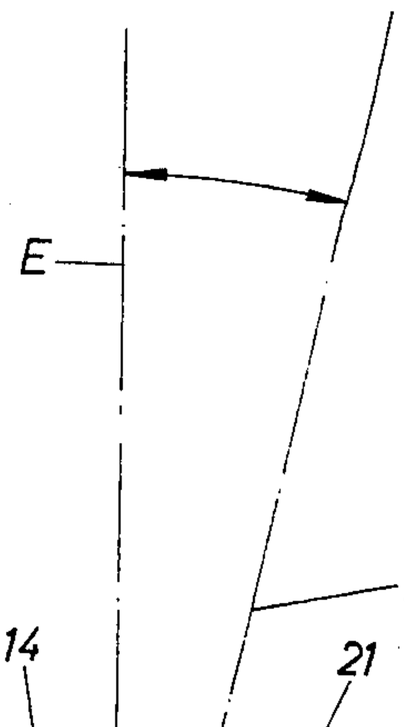


Fig.3

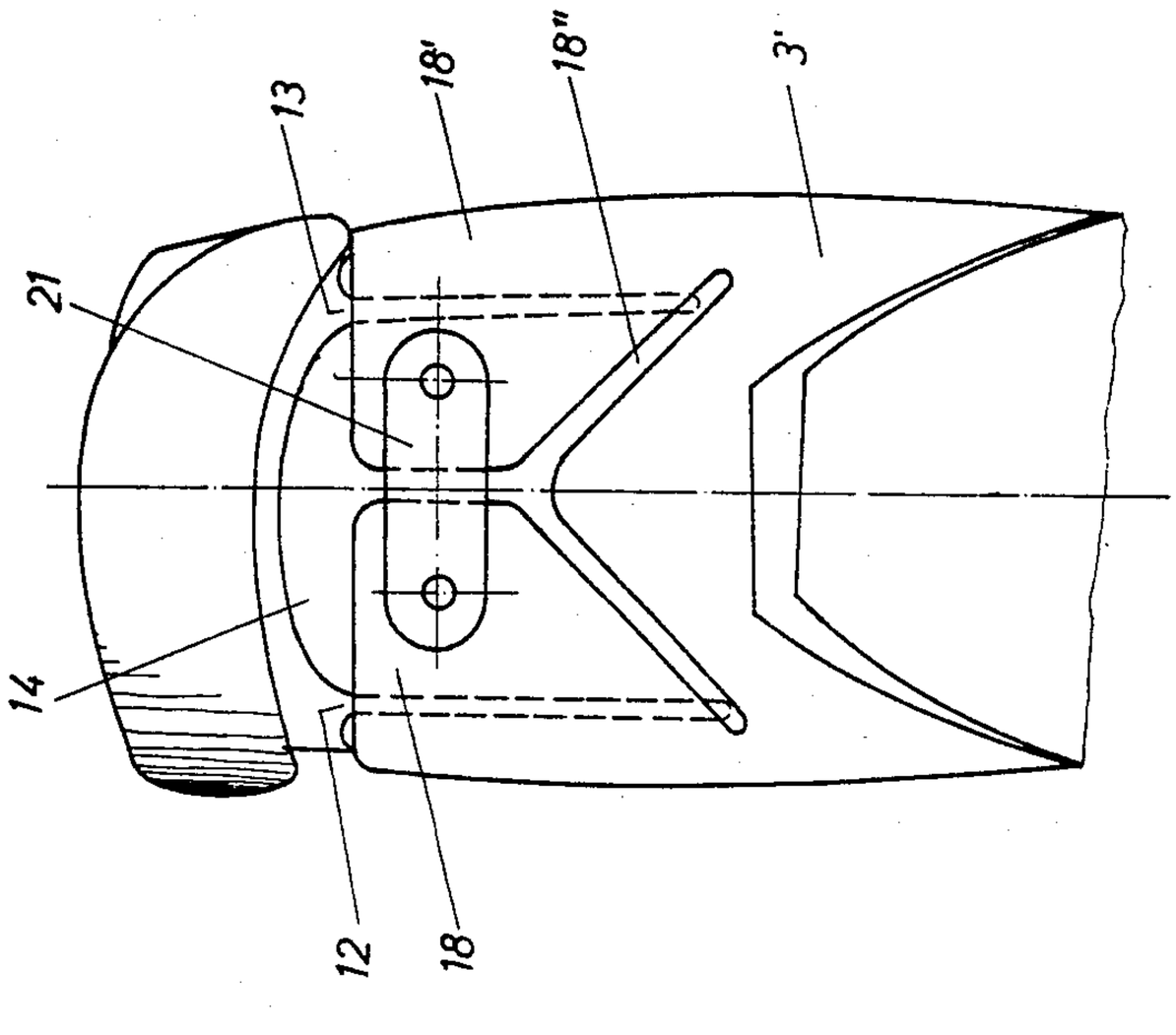


Fig. 4

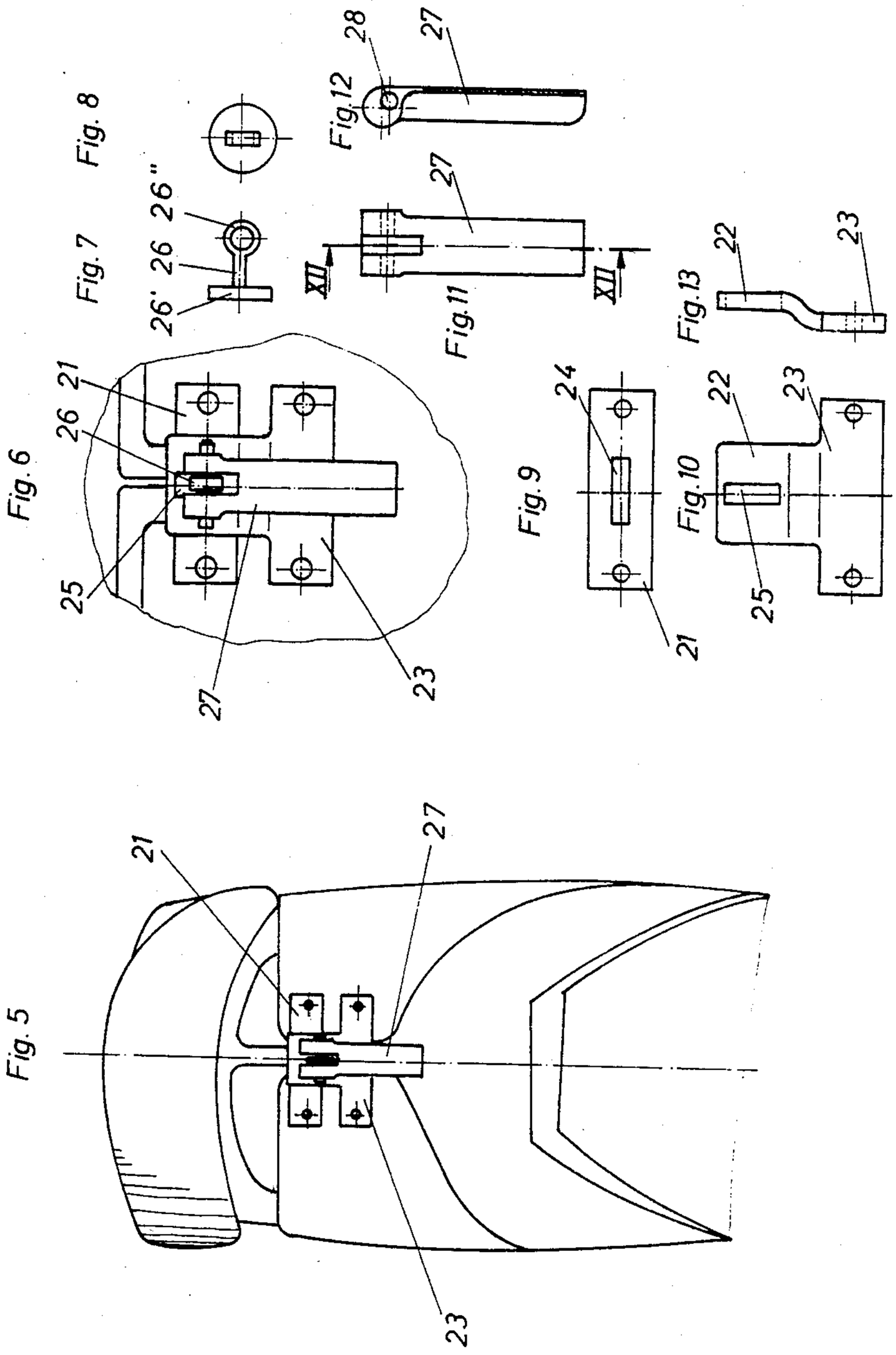


Fig. 8
Fig. 7
26"
26
26'
Fig. 12
28
27
Fig. 11
27
XII
XII
Fig. 13
22
23
Fig. 6
21
26
25
27
23
Fig. 9
24
21
Fig. 10
22
23
25
Fig. 5
21
27
23

Fig. 15

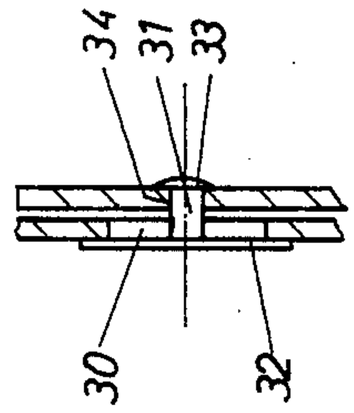


Fig. 14

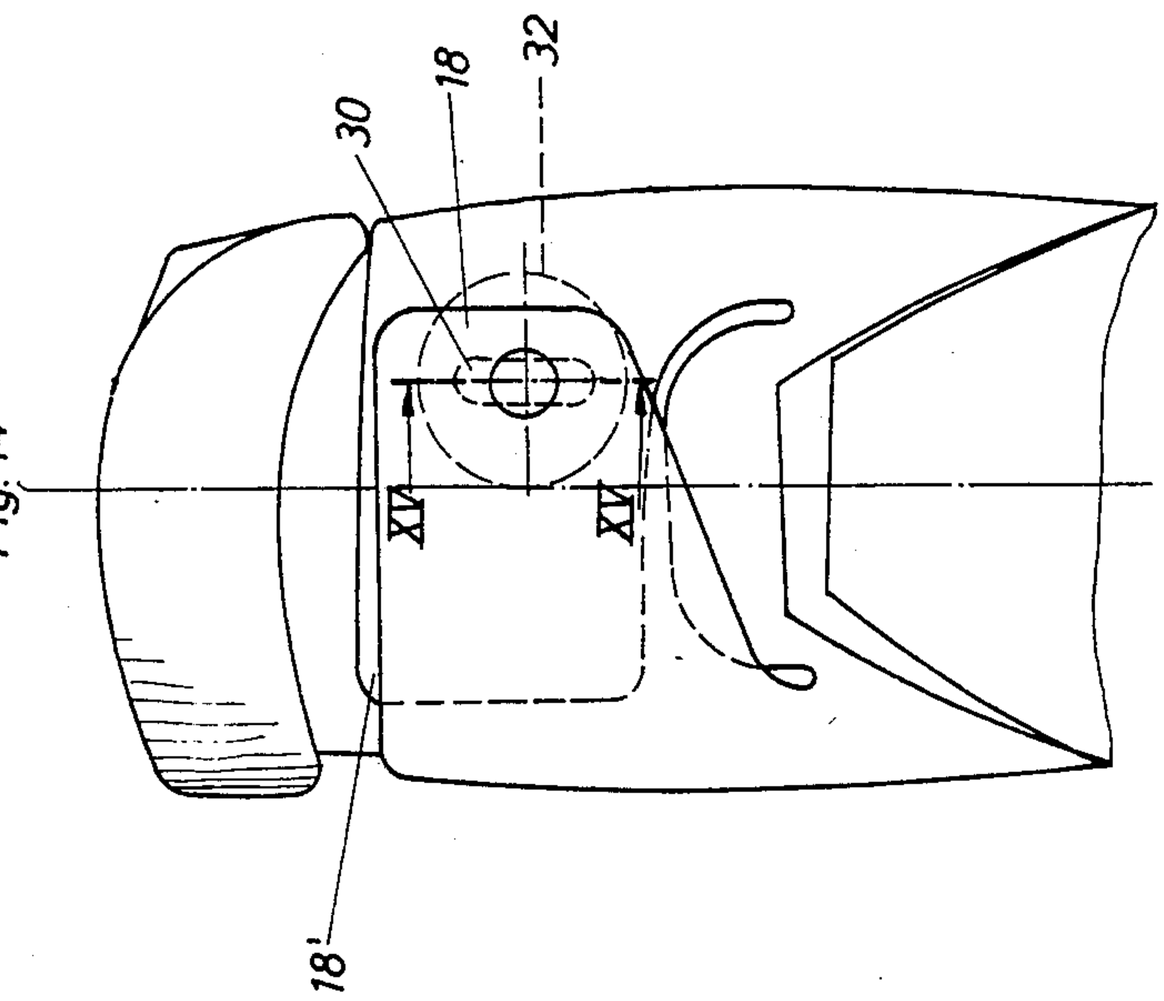


Fig. 16

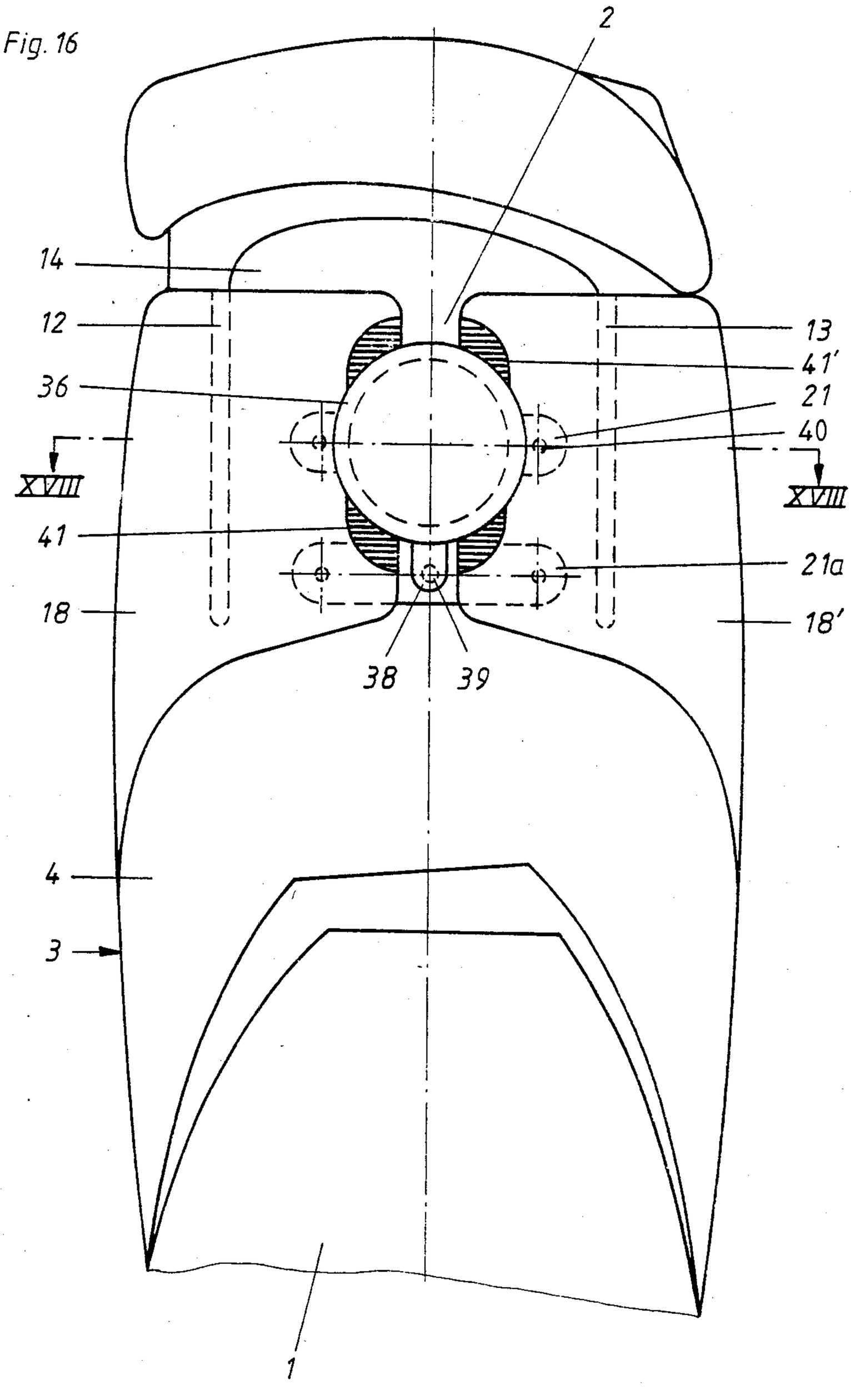


Fig. 17

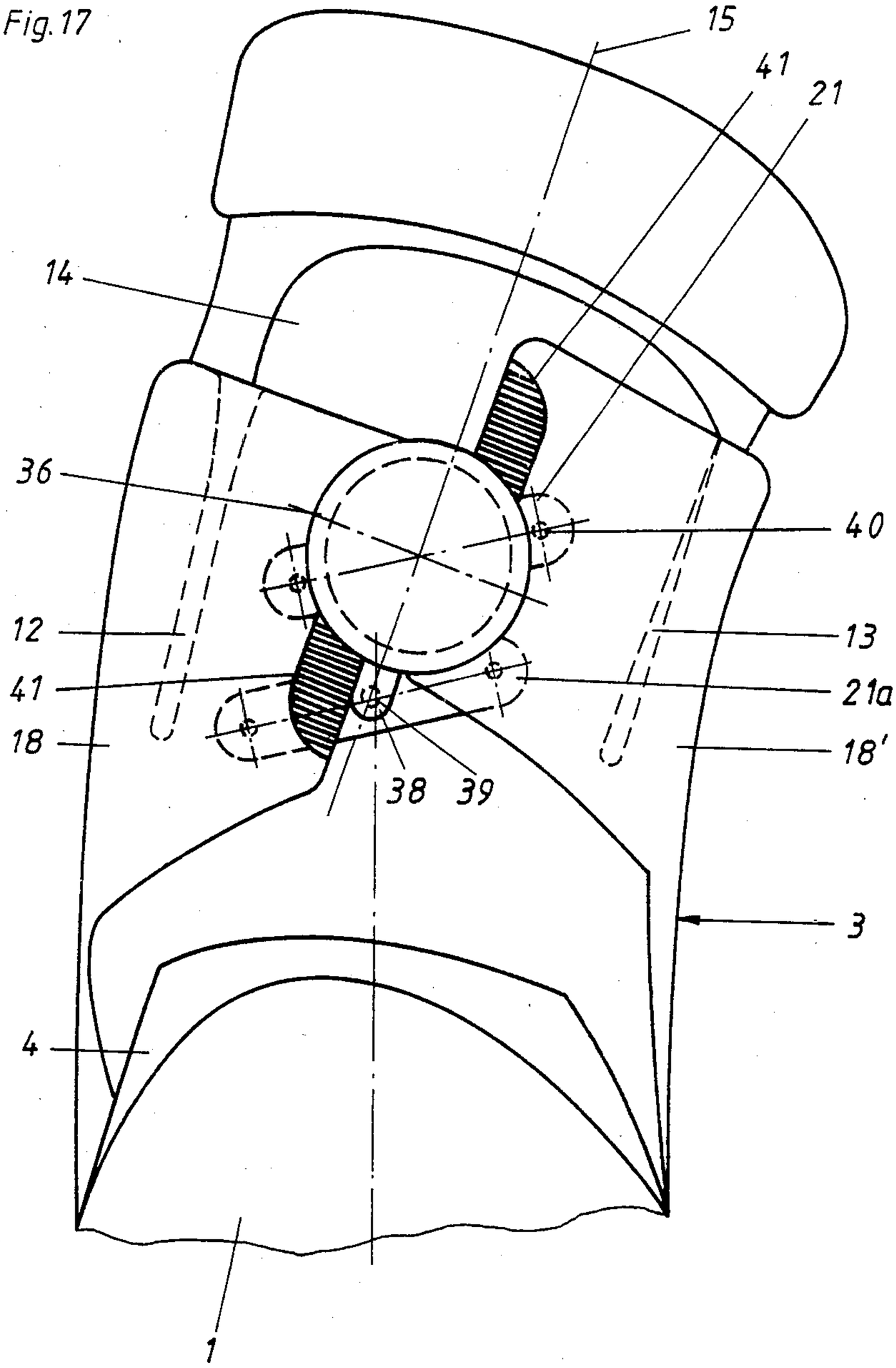


Fig.18

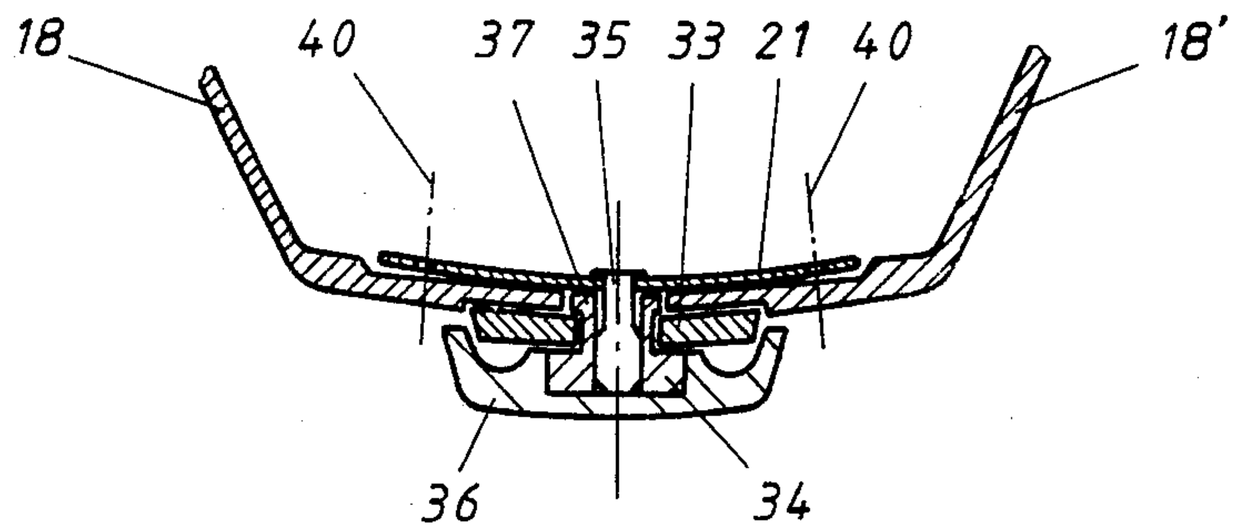


Fig.19

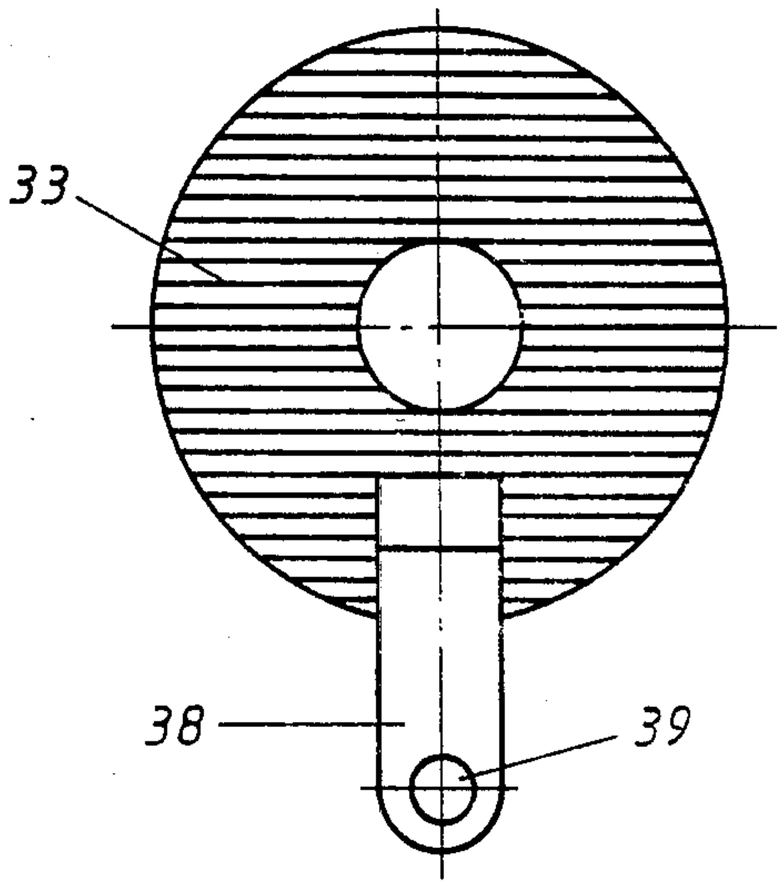
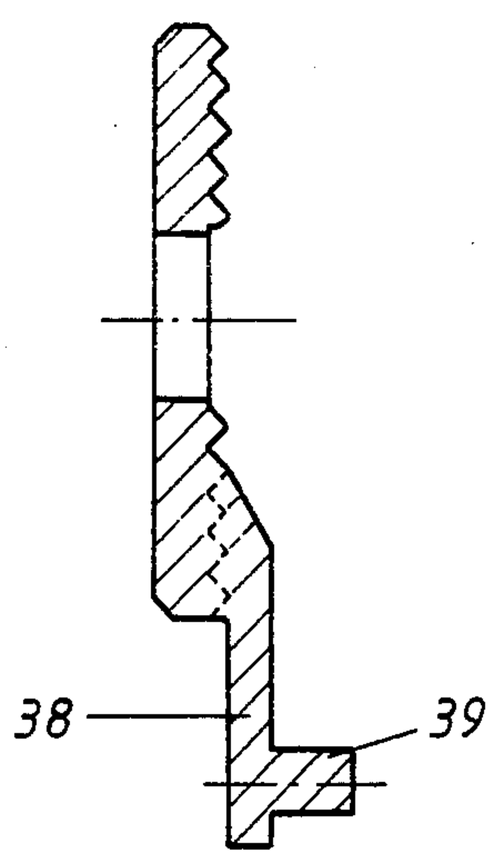


Fig.20



SKI BOOT

The present invention relates to a ski shoed boot having a casing or sheel and a leg portion which is forwardly and rearwardly pivotable relative to said shell and, for entry into the boot from the rear the leg portion comprises a sleeve, which surrounds the front, lower portion of the shin bone and is open towards the rear, and a cover which is forwardly-upwardly and rearwardly-downwardly pivotable relative to said sleeve and, when the boot has been put on, the cover is securable on the sleeve by a closing means, said sleeve having in its front region at least one slot which extends downwardly from the upper edge of the sleeve.

With a "rear entry boot", there exists the problem that, by closing the cover, a pressure is exerted upon the unsymmetrical shin bone which is normally outwardly displaced relative to the central plane of the foot lying in the direction of travel, such a pressure pressing the leg into a central location in which the leg occupies an X position. To compensate for this phenomenon, when the skier crouches or squats during normal skiing, he is inclined to load only the outer edges of the skis and to raise the inner edges thereof. In particular, this is detrimental to the unskilled skier when negotiating a bend or turning, during an snowplough movement and especially during pivotal movement.

The present invention seeks to provide measures whereby, when the cover is closed, the leg portion and the sleeve comply with the anatomically correct position and form of the shin bone. With a ski boot of the above-mentioned type, this object is achieved according to the invention, in that two flaps are provided to keep the sleeve portions together, such flaps surrounding the upper region of the sleeve and being pivotally interconnected so that the flaps are adjusted or displaced in opposite directions to each other by the movements of the foot.

According to a further feature of the invention, a slot is additionally provided in the longitudinal centre of the sleeve. This additional slot may be shorter and wider than the two lateral slots, so that two portions are produced which are mirror-inverted relative to the longitudinal central plane of the ski boot and permit the sleeve to be adapted to the anatomical form of the shin bone in a very precise manner, even if there are some irregularities.

The arrangement for keeping the sleeve portions together is advantageously securable in the reciprocal position of the sleeve portions resulting after the cover has been closed.

Finally, it is an object of the invention that, in order to keep the sleeve portions together, two flaps are provided which surround the upper region of the sleeve and extend from the two sides of the sleeve, such flaps being pivotally connected at their free ends.

SUMMARY OF INVENTION

A ski boot having a casing or shell portion and a leg portion which, in the direction of movement of the shoe, is pivotable about an axis perpendicular to said direction of travel and comprises a cuff or sleeve, which surrounds the front, lower portion of the shin bone, and a cover which is mounted opposite said sleeve so as to be pivotable about an axis perpendicular to the direction of travel and is connectable to the sleeve of the boot by a closing means.

The sleeve is provided with slots in the front, central region over a portion of its height, extending from the upper edge downwardly, and has two flaps which are displaceable in opposite directions, said flaps being connected by means of pivot or guide members and being securable in any position.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

FIGS. **1** and **2** are, respectively, a front view and a plan view of part of a ski shoe or boot showing the cover in its inwardly pivoted position but before the cover has been clamped to the sleeve;

FIG. **3** illustrates the boot after the cover has been clamped to the sleeve;

FIG. **4** is a front view of an additional embodiment of the ski boot;

FIG. **5** is a front view of an additional embodiment of the ski boot.

FIGS. **6** to **13** illustrate details of the embodiment shown in FIG. **5**;

FIG. **12** being a sectional view taken along the line XII—XII of FIG. **11**;

FIG. **14** illustrates an additional embodiment of the ski boot;

FIG. **15** is a sectional view taken along the line XV—XV of FIG. **14**;

FIG. **16** is a front view of the ski boot, wherein the shaft/leg portion flaps are in the/their central position, a portion of the shoe shell having been removed;

FIG. **17** illustrates the ski boot with displaced leg portion flaps in the position of use;

FIG. **18** is a sectional view, taken along the line XVIII—XVIII of FIG. **16**, through the leg portion flaps and the securing mechanism;

FIG. **19** is a plan view of the toothed plate; and

FIG. **20** is a lateral view of the toothed plate.

The ski boot which has been selected as an embodiment is provided with an entry at the heel end and comprises a casing or shell **1** and a shaft or leg portion **3** which is forwardly and rearwardly pivotable relative to said shell **1** and has, in the present case, a sleeve **4** at the instep end and a cover **5** at the heel end, such a cover **5** being preferably pivotable mounted on said sleeve and being connectable, in the position of use, to the sleeve **4** by a closing means, e.g. in the form of a tensioning belt. An inner boot portion or shoe **6** is inserted into the ski boot and has a heel portion **7** which is pivotable together with the cover **5**. When the boot has been put on, the cover **5** is retained on the sleeve **4** by means of the tensioning belt, one end of which belt can be mounted on one of the lateral walls of the leg portion **3** and the other end can be adjustably secured to the other wall of the leg portion **3**. With conventional ski boots, the user's leg denoted by **9** in section in FIG. **2** is clamped in position in such a manner that the shin bone **10** is displaced from the longitudinal central plane E towards the inside of the boot, so that a gap **11** is produced on the outside of the central plane E, but this gap is to be eliminated by the measures proposed by the present invention.

For this purpose, the sleeve **4** is provided on each side of the longitudinal central plane E, at a distance therefrom, with a respective slot **12**, **13** which extends from the upper edge of the sleeve **4** over a portion of its height. This produces a section **14** which, as FIG. **3** shows, may be adapted to the shin bone axis—indicated by the dash-dot line **15**—and consequently compensates

for the gap **11**, so that the inner shoe **6** completely abuts against the leg of the skier. To keep the section **14** and the other portions of the sleeve together during downhill travel, i.e. when the skier has bent his knees, flaps **18** and **18'** are used which, just like the sleeve **4**, may be formed from plastics material, and such flaps extend from the later walls **19** and **20** of the sleeve **4** beyond the slots **12** and **13**, e.g. the flaps are mounted at the location where the tightening belt is also attached. In the present case, the two leg portion flaps **18** and **18'** are in the central position so as to be mirror-inverted relative to the longitudinal central plane, a gap **2** existing between the two flaps **18, 18'**. These flaps extend substantially along the upper edge of the sleeve **4** and are interconnected at their free ends by means of a guide or pivot member **21** so that, when one flap is forced upwardly, the other has to move downwardly, and vice versa (cf, FIG. **3**). The pivot member **21** bridges the gap between the two free ends of the flaps **18, 18'** and is pivotally connected to each of them. Although the two flaps in the present case are independent components parts which are connected to the sleeve **4**, it is possible to extrude these components parts integral with the lateral walls **19** and **20** of the sleeve **4**.

As shown by dotted lines in FIG. **1**, the second **14** may be divided centrally into two portions by means of an additional slot **29** which is preferably shorter than the slots **12** and **13**. This measure ensures a better adaptability for the inner shoe—especially if there are irregularities in the leg.

Because of the measures according to the invention, the sleeve **4** is displaced above the ankle, as shown in FIG. **3**, and consequently adapts to the anatomically correct position and form of the shin bone after the cover **5** has been closed. This position of the sleeve **4** may be secured by an arrangement which is shown in FIGS. **6** to **13**, in that the pivot member **21** is secured, for example, in this position.

Upon displacement of the flaps **18** and **18'**, the pressure exerted upon the leg is increased by the upwardly moving flaps, whereas the pressure exerted by the downwardly moving flaps is reduced. Consequently, the ski is uniformly loaded over its entire width, with the result that the ski can also be guided well.

In the embodiment shown in FIG. **4**, the two flaps **18** and **18'** are component parts of an extension portion **3'** of the shoe leg portion, which extension portion **3'** surrounds at least the front portion of the sleeve; the flaps **18** and **18'** are separated from the above-mentioned extension portion **3'** by means of a slot **18''** which corresponds in shape to an inverted "Y"

In the embodiment of the ski shoe shown in FIG. **5**, the pivot member **21** is covered by the arm **22** of a crosspiece member **23** which is situated lower down, a transverse slot **24** being provided in the pivot member **21** and longitudinal slot **25** being provided in the arm **22**. A pin **26** is passed through both slots, such pin extending from a pressure plate **26'** having an eyelet **26''** at its free end. A journal **28** passes through the eyelet **26''** and eccentrically penetrates the cylindrical, forked end of a tightening or tensioning lever **27** which acts as an eccentric lever.

Due to the arrangement whereby the two slots **24** and **25** extend perpendicular to one another and lie one above the other in the pivot member **21** and extension member **22**, respectively, these components parts are freely displaceable relative to one another upon the reciprocal displacement of the flaps **18** and **18'** as long as the tensioning lever **27** is raised. If, however, the lever **27** is pressed towards the shoe, the pressure plate is drawn towards the pivot member **21** and the forked end of the lever **27** presses against the extension member **22**. The pivot member **21** and the crosspiece member **23** are secured relative to one another by means of frictional forces, and the sleeve can no longer be displaced.

The skier climbs into the shoe, closes the cover **5** and bends his knees so that he adopts the downhill travelling position; this causes the lever **27** to be opened, i.e. pivoted away from the shoe, so that the sleeve can adopt the position shown in FIG. **3**. Thereafter, the lever **27** is pressed against the boot so that the eccentric secures the crosspiece member **23** in the position presented by the leg, as mentioned above. Consequently, the skier has a firm support in the shoe an hence achieves good guidance for the ski. As soon as the downhill travel has finished, the skier can adopt a more confortable position in the shoe by opening the lever **27**.

Finally, it is possible also to omit the flaps **18** and **18'** and to attach the pivot member **21** directly to the slotted sleeve. Instead of using the eccentric means which has been described, it is also possible to use any other securing means.

According to FIG. **14**, the two flaps **18** and **18'** lie with their free ends one above the other. The end of the flap **18'**, which lies underneath in this case, is provided with a slot **30** which extends in a straight line or possibly in a curve and substantially extends downwardly from above. This slot is pierced or passes through by a pin **31** which is secured, at one end, to a pressure plate **32** and pierces or passes through a bore **34** in the free end of the upper flap **18'** whilst its other end has a wide head **33**.

In the embodiment, pivot member **21** or pivot member **21*a*** and crosspiece member **23** are replaced by the slot **30** and the pin **31** which have the same function of holding the flaps together.

By applying a thread instead of the head **33**, onto which thread a knurled nut is possibly screw-mounted, it is also possible here to achieve the reciprocal securement of the flaps **18** and **18'** by means of frictional forces.

In the arrangement of the ski boot as shown in FIGS. **16** to **20**, the two leg portion flaps **18** and **18'** are connected by means of two pivot members **21** and **21*a*** which are disposed at a vertical spacing from each other, the upper pivot member **21** being disposed at approximately the vertical centre of the two leg portion flaps **18** and **18'**. The two pivot members **21** and **21*a*** are pivotally connected at their ends to the leg portion flaps **18** and **18'** by means of rivets **40**, for example.

In the gap **2**, a threaded bolt **35** (FIG. **18**) is provided which is non-rotatably riveted with its inner end in the upper connecting pivot member **21** and supports an adjustment nut **34** which is non-rotatably pressed into a securing knob **36**. A round, toothed plate **33** is detachable mounted on the adjustment nut **34** and is prevented from becoming detached by means of a collar **37** or the like. As can be seen from FIGS. **4** and **5**, the toothed plate **33** is provided in its lower portion with a lug **38** which extends downwardly in the longitudinal central plane and, at its lower end, has a journal **39** which is rotatably mounted in the lower connecting pivot member **21*a*** (FIGS. **16** and **17**).

Along each of their edges facing the gap **2**, the two leg portions **18** and **18'** have a toothed profile **41** and **41'**, respectively, which corresponds to the toothed profile of the toothed plate **33** and can be brought into engage-

ment with said profile, as will be described more fully hereinafter.

Before the skier steps into the ski boot, the lock knob **36** is unscrewed with its adjustment nut **34** on the threaded bolt **35** until the toothed plate **33** disengages from the toothed profiles **41** and **41'**.

Once the skier has stepped into the ski boot, he presses the sleeve laterally as a result of the irregularities of the leg, as shown in FIG. **17**, so that the flaps **18** and **18'** are displaced in opposite directions. This measure causes one slot—in the present case slot **13**—to be compressed and the other slot—in this case slot **12**—to be enlarged.

Consequently, the flap **14**—formed between slots **12** and **13**—is displaced laterally and the entire boot adapts to the form of the leg, so that the leg is supported firmly and comfortably in the shoe. When the ski boot is in this position, the locking knob **36** is rotated until the toothed plate **33** engages with the two toothed profiles **41** and **41'**, whereby the boot is secured in the position set by the foot.

I claim:

1. A ski boot having a casing and a leg portion which is forwardly and rearwardly pivotable to said casing and, for entry into the boot from the rear, the leg portion comprises a sleeve, which surround the front, lower portion of the shin bone and is open towards the rear, and a cover which is forwardly-upwardly and rearwardly-downwardly pivotable relative to said sleeve and, when the boot has been put on, the cover is securable on the sleeve by a closing means, said sleeve having a front region with a least one slot which extends downwardly from an upper edge of the sleeve so as to define adjacent sleeve portions separated by the slot, characterized in that two flaps are provided on the sleeve to keep the sleeve portions together, such flaps surrounding said region of the sleeve and being pivotally interconnected by means of a pivot member which is pivotally connected to each of the flaps about an axis perpendicular to the plane of the flap so that the flaps are displaced in opposite directions to each other by movements of the foot.

2. A ski boot according to claim **1** wherein for locking the flaps in a selected position, a crosspiece member provided with a central extension portion extends parallel to the pivot member and is connected between the flaps so that the extension portion covers the central portion of the pivot member, and wherein a device is provided with a releasable locking lever on a fitting connected between the pivot member and the extension portion for the frictional compression of the pivot member and extension portion.

3. A ski boot according to claim **1**, wherein the sleeve has at least two slots which are substantially mirror-inverted relative to the longitudinal central plane of the shoe.

4. A ski boot according to claim **1**, wherein means are provided which serve to secure the leg portion flaps in a position set by the position of the foot after closure of the shoe, said means having a securing knob and an adjustable pressure member which is provided between the flaps so that the pressure member in one position, establishes a locking connection with the flaps and in another position, releases this connection.

5. A ski boot according to claim **4**, wherein said knob is adjustable substantially perpendicular to the pressure member and has a locking emmber which co-operates with a counter-locking member for the flaps.

6. A ski boot according to claim **4**, wherein said knob is rotatably mounted on a threaded bolt by means of a nut which is secured in said knob and supports a toothed plate which is engageable with a toothed profile of the flaps.

7. A ski boot according to claim **6**, wherein the toothed plate is detachably mounted on the nut, and the toothed plate extends over/beyond both toothed profiles of the flaps.

8. A ski boot according to claim **1**, wherein said pivot member is connected, via the intermediary of a lug, to means for securing said flaps in a position which they adopt.

* * * * *